

Claims

What is claimed is:

1. A method for managing a fault comprising:
 - detecting an error;
 - gathering data associated with the error to generate an error event; and
 - categorizing the error event using a hierarchical organization of the error event.
2. The method of claim 1, further comprising:
 - diagnosing the error using the error event to generate the fault;
 - generating a fault event using the fault; and
 - categorizing the fault event using a hierarchical organization of the fault event.
3. The method of claim 2, further comprising:
 - organizing the fault event using an error numeric association component, wherein the error numeric association component uniquely identifies the error event.
4. The method of claim 2, wherein a class component of the fault event defines a name of the fault event in accordance with the hierarchical organization.
5. The method of claim 2, further comprising:
 - forwarding the fault event to a fault management architecture agent.
6. The method of claim 1, further comprising:
 - organizing the error event using an error numeric association component, wherein the error numeric association component uniquely identifies the error event.
7. The method of claim 1, wherein a class component of the error event defines a name of the error event in accordance with the hierarchical organization.

8. The method of claim 1, wherein gathering data associated with the error comprises gathering data to populate the following components within the error event comprising:
 - a version component defining a version of a protocol used to define the error event;
 - a class component defining a name of the error event using the hierarchical organization of the error event;
 - an error numeric association component uniquely identifying the error event;
 - a detector component identifying a resource that detected the error; and
 - a recoverable component indicating whether the error handler designated the error as recoverable.
9. The method of claim 8, wherein gathering data associated with the error further comprises:
 - gathering data to populate a disposition component within the error event, wherein the disposition component indicates a result of an error handler attempt to correct the error.
10. The method of claim 9, wherein the disposition component comprises at least one selected from the group consisting of uncorrected, self-corrected, uncorrectable, and soft-corrected.
11. The method of claim 8, wherein the class component is defined using a string representation of a hierarchical organization of the error event.
12. The method of claim 8, wherein the error numeric association component is defined using at least one format selected from the group consisting of Format 0, Format 1, Format 2, and Format 3.

13. The method of claim 12, wherein Format 0 comprises a pointer to an error propagation tree.
14. The method of claim 12, wherein Format 1 comprises a time element, a central processing unit identification element, and a generation element.
15. The method of claim 12, wherein Format 2 comprises a time element, a sequence number element, and a generation element.
16. The method of claim 12, wherein Format 3 comprises code indicating an extended format field.
17. The method of claim 8, wherein the detector component is defined using a fault managed resource identifier.
18. The method of claim 17, wherein the fault managed resource identifier comprises an authority element.
19. The method of claim 17, wherein fault managed resource identifier is defined using a scheme.
20. The method of claim 19, wherein the scheme comprises at least one selected from the group consisting of a hardware component scheme, a diagnosis-engine scheme, a device scheme, and a service scheme.
21. The method of claim 2, wherein generating the fault event comprises gathering data to populate the following components in the fault event:
 - a version component defining a version of a protocol used to define the fault event;
 - a class component defining a name of the fault event using the hierarchical organization of the fault event;

- a diagnosis engine identifier component identifying a diagnosis engine used to obtain the fault;
 - an error numeric association list component including at least one error numeric association;
 - an automatic system reconfiguration unit component defining a unit that may be reconfigured in response to the fault;
 - a resource component defining a finest-grain resource identified by the diagnosis engine;
 - a field replaceable unit component defining a unit that must be repaired to clear the fault; and
 - a certainty component identifying a level of certainty attributed to the fault diagnosed by the diagnosis engine.
22. The fault event of claim 21, wherein generating the fault event further comprises:
gathering data to populate a fault diagnosis time component, wherein the fault diagnosis component further comprises indicating a time the diagnosis of the fault was performed.
23. The method of claim 21, wherein the class component is defined using a string representation of a hierarchical organization of the error event.
24. The method of claim 21, wherein the error numeric association component is defined using at least one format selected from the group consisting of Format 0, Format 1, Format 2, and Format 3.
25. The method of claim 24, wherein Format 0 comprises a pointer to an error propagation tree.
26. The method of claim 24, wherein Format 1 comprises a time element, a central processing unit identification element, and a generation element.

27. The method of claim 24, wherein Format 2 comprises a time element, a sequence number element, and a generation element.
28. The method of claim 24, wherein Format 3 comprises code indicating an extended format field.
29. The method of claim 21, wherein at least one selected from the group consisting of the diagnosis engine identifier component, the automatic system reconfiguration unity component, the field recoverable unit component and the resource component is defined using a fault managed resource identifier.
30. The method of claim 29, wherein the fault managed resource identifier comprises an authority element.
31. The method of claim 29, wherein the fault managed resource identifier is defined using a scheme.
32. The method of claim 31, wherein the scheme comprises at least one selected from the group consisting of a hardware component scheme, a diagnosis-engine scheme, a device scheme, and a service scheme.
33. The method of claim 2, wherein generating a fault event comprises associating the fault event with a suspect list.
34. The method of claim 33, wherein the suspect list comprises:
 - a universal unique identifier component identifying the suspect list;
 - a diagnosis engine identifier component identifying a diagnosis engine used to diagnosis the error event that subsequently generated the fault event; and
 - a fault-events component listing the fault event.

35. A system for managing a fault comprising:
 - an error handler detecting an error and generating an error event using the error, wherein the error is defined using a hierarchical organization of the error event;
 - a fault manager diagnosing the error event to obtain the fault and generating a fault event using the fault, wherein the fault event is defined using a hierarchical organization of the fault event; and
 - a fault management architecture agent receiving the fault event and initiating an action in accordance with the fault event.
36. The system of claim 35, wherein the fault manager organizes the error event using an error numeric association component of the error event.
37. The system of claim 35, wherein the fault management architecture agent organizes the fault event using an error numeric association component of the fault event.
38. The system of claim 35, wherein the error event comprises:
 - a version component defining a version of a protocol used to define the error event;
 - a class component defining a name of the error event using the hierarchical organization of the error event;
 - an error numeric association component uniquely identifying the error event;
 - a detector component identifying a resource that detected the error; and
 - a recoverable component indicating whether the error handler designated the error as recoverable.
39. The system of claim 38, wherein the error event further comprises:
 - a disposition component indicating a result of an error handler attempt to correct the error.

40. The system of claim 39, wherein the disposition component comprises at least one selected from the group consisting of uncorrected, self-corrected, uncorrectable, and soft-corrected.
41. The system of claim 38, wherein the class component is defined using a string representation of a hierarchical organization of the error event.
42. The system of claim 38, wherein the error numeric association component is defined using at least one format selected from the group consisting of Format 0, Format 1, Format 2, and Format 3.
43. The system of claim 42, wherein Format 0 comprises a pointer to an error propagation tree.
44. The system of claim 42, wherein Format 1 comprises a time element, a central processing unit identification element, and a generation element.
45. The system of claim 42, wherein Format 2 comprises a time element, a sequence number element, and a generation element.
46. The system of claim 42, wherein Format 3 comprises code indicating an extended format field.
47. The system of claim 38, wherein the detector component is defined using a fault managed resource identifier.
48. The system of claim 47, wherein the fault managed resource identifier comprises an authority element.
49. The system of claim 47, wherein the fault managed resource identifier is defined using a scheme.

50. The system of claim 47, wherein the scheme comprises at least one selected from the group consisting of a hardware component scheme, a diagnosis-engine scheme, a device scheme, and a service scheme.
51. The system of claim 38, wherein the fault event comprises:
 - a version component defining a version of a protocol used to define the fault event;
 - a class component defining a name of the fault event using the hierarchical organization of the fault event;
 - a diagnosis engine identifier component identifying a diagnosis engine used to obtain the fault;
 - an error numeric association list component including at least one error numeric association;
 - an automatic system reconfiguration unit component defining a unit that may be reconfigured in response to the fault;
 - a resource component defining a finest-grain resource identified by the diagnosis engine;
 - a field replaceable unit component defining a unit that must be repaired to clear the fault; and
 - a certainty component identifying a level of certainty attributed to the fault diagnosed by the diagnosis engine.
52. The system of claim 51, wherein the fault event further comprises:
 - a fault diagnosis time component indicating a time the diagnosis of the fault is performed.
53. The system of claim 51, wherein the class component is defined using a string representation of a hierarchical organization of the error event.

54. The system of claim 51, wherein the error numeric association component is defined using at least one format selected from the group consisting of Format 0, Format 1, Format 2, and Format 3.
55. The system of claim 54, wherein Format 0 comprises a pointer to an error propagation tree.
56. The system of claim 54, wherein Format 1 comprises a time element, a central processing unit identification element, and a generation element.
57. The system of claim 54, wherein Format 2 comprises a time element, a sequence number element, and a generation element.
58. The system of claim 54, wherein Format 3 comprises code indicating an extended format field.
59. The system of claim 51, wherein at least one selected from the group consisting of the diagnosis engine identifier component, the automatic system reconfiguration unity component, the field recoverable unit component, and the resource component is defined using a fault managed resource identifier.
60. The system of claim 59, wherein the fault managed resource identifier comprises an authority element.
61. The system of claim 59, wherein the fault managed resource identifier is defined using a scheme.
62. The system of claim 61, wherein the scheme comprises at least one selected from the group consisting of a hardware component scheme, a diagnosis-engine scheme, a device scheme, and a service scheme.
63. The system of claim 35, wherein the fault event is included in a suspect list.

64. The system of claim 63, wherein the suspect list comprises:
 - a universal unique identifier component identifying the suspect list;
 - a diagnosis engine identifier component identifying a diagnosis engine used to diagnosis the error event that subsequently generated the fault event; and
 - a fault-events component listing the fault event.
65. The system of claim 35, wherein diagnosing the error event comprising forwarding the error event to a diagnosis engine.
66. A network system having a plurality of nodes, comprising:
 - an error handler detecting an error and generating an error event using the error, wherein the error is defined using a hierarchical organization of the error event;
 - a fault manager diagnosing the error event to obtain the fault and generating a fault event using the fault, wherein the fault event is defined using a hierarchical organization of the fault event; and
 - a fault management architecture agent receiving the fault event and initiating an action in accordance with the fault event,
wherein the error handler executes on any node of the plurality of nodes,
wherein the fault manager executes on any node of the plurality of nodes, and
wherein the fault management architecture agent executes on any node of the plurality of nodes.
67. The network system of claim 66, wherein the error is detected on a first node of the plurality of nodes and the error event is generated on a second node of the plurality of nodes.
68. The network system of claim 66, wherein the error event is received by the fault manager on a first node of the plurality of nodes and the error event is diagnosed by a diagnosis engine on a second node of the plurality of nodes.

69. The network system of claim 66, wherein the fault manager organizes the error event using an error numeric association component of the error event.
70. The network system of claim 66, wherein the fault management architecture agent organizes the fault event using an error numeric association component of the fault event.